DOCUMENT RESUME

ED 274 205 FL 016 089

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TITLE Reading in English as a Foreign Language: Some Recent Research.
PUB DATE 86
NOTE 10p.; In: WATESOL Working Papers, Number 3, Spring 1986; see FL 016 085.
PUB TYPE Information Analyses (070) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Comparative Analysis; *Content Area Reading; *English (Second Language); Foreign Countries; Learning Processes; Psycholinguistics; *Reading Instruction; *Reading Processes; *Reading Research; Research Methodology; Second Language Instruction

ABSTRACT

Research on content area reading in English as a second language (ESL) has focused on the psycholinguistic and educational aspects of reading. Psycholinguistic research has found that reading comprehension is not solely a result of text variables such as sentence complexity and length or vocabulary, but is largely dependent on reader variables, including language competence, and variables in method of testing and experimentation, since comprehension can be measured only indirectly. Much of the research has been psychometric and removed from real-life reading situations, and has not looked at the process of comprehending as distinguished from comprehension, the result. A group of educators in Sweden has taken a phenomenological approach, looking at the learning process and its outcome instead of comprehending and comprehension. These studies call for a more holistic approach to learning and point to new directions in research on ESL content-area reading, such as examining the context from the student's perspective and comparing the learning processes and outcomes of nonnative readers' work in ESL and the native language. This approach would complement current psychometric experimentation and form a better basis for teaching English for academic purposes. (MSE)

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READING IN ENGLISH AS A FOREIGN LANGUAGE: SOME RECENT RESEARCH*

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My purpose is to review content-area reading in English as a foreign language, first within a linguistic framework, then within an educational one. The emphasis will be on recent empirical research and its implications for the teaching of reading to non-native speakers.

Within a **psycholinguistic** framework (Rumelhart 1981), a distinction is made between comprehending and comprehension.

Comprehending is an interactive process between the writer and the reader. The text by itself - the words, sentences or passages used - does not have a meaning. It only directs the reader to construct meaning from his/her background knowledge. This background knowledge is structured in schemata. They vary, they are hierarchically organized; they can be concrete or abstract. In comprehending, one schema at a time becomes activated in the reader's mind.

In fact, there are two modes of schema activation. One of them is usually referred to as top-down or concept-driven processing, the other as bottom-up or data-driven processing. In the first case, the reader proceeds from whole to parts, in the second, from parts to whole. In this processing the reader tests various schemata until s/he finds one that adequately accounts for the text s/he is reading. The result is comprehension.

Occasionally the reader will not understand the text correctly. Rumelhart (1981) gives three reasons for this. Firstly, the reader may not have the appropriate schema. Therefore the concept being communicated will not make any sense to the reader. Secondly, the reader may have the appropriate schema, but the clues in the text will perhaps not be sufficient to activate it. In this case, the text will not make any sense to the reader, either. With additional clues, however, it may be comprehended. Thirdly, the reader may resort to a schema different from the one intended by the writer. In this case, there will be two interpretations to the text. The reader may be said to have misunderstood the writer.

Let me take an example. Consider the following sentence in Finnish:

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Poliisi pysäytti henkilöauton.

Beginners of Finnish will probably process this from bottom-up, that is letter-by-letter, word-by-word. In this process, they try to relate it to something familiar, a schema. The text, however, does not have many clues for them to activate a schema. Therefore they probably will not understand it.

On the other hand, consider the above sentence in English (adapted from Collins and Quillian 1972, discussed in Carrell and Eisterhold 1983):

The policeman stopped the car.

Native speakers of English will either process this from bottom-up or top-down, if they happen to know beforehand that the whole text is about traffic regulation in general or possibly about a particular traffic cop say, on M Street in Washington DC.

The schema most likely to be activated is a traffic cop one. Interestingly, this schema may activate related ideas, not explicit in the text: the policeman may have wanted to stop the car because the driver of the car was driving through a red light, or because he was drunk, or because there had been a car accident, and so on. At any rate, these readers will comprehend the text.

Further, let us consider the sentence as part of a reading comprehension test. Two students, Sam and Tom, will be asked to answer two inferential questions about the text; first, 'Did the policeman's hand touch the car?'; second, 'Were the car's brakes applied?'

Sam reads the text with the traffic cop schema in his mind. Accordingly, the policeman only raises his hand to signal to the driver to stop his car, and so he applies the brakes. Therefore, Sam's answer to the first question is 'No' and to the second 'Yes.' Tom, on the other hand, considers a Superman schema the most appropriate for the interpretation of the text. So he thinks that Superman forcefully stops the car with his hand, and so the driver need not apply the brakes at all. This is fiction. Consequently, Tom's answers to the two questions are 'Yes' and 'No.' Two different schemata were activated: Sam probably understood the writer, whereas Tom did not.

Recent psycholinguistic reading comprehension modelling (Goodman 1968, Smith 1978) and the schema theory (Rumelhart 1981, Widdowson 1983) have implications not only for conducting English as a foreign language reading comprehension classes (e.g. Been 1975, Berman 1975, Pierce 1975, Clark and Silberstein 1977, Carrell and Eisterhold 1983) but also for testing and experimentation.

Let me review three experiments which seem representative, first, for their problems and methods, and secondly, for their subjects. They are among the few experiments with young non-native adult speakers of English.

Study 1. In their four related studies Cohen et al. (1979)

posed the question: "What is problematic for non-native readers when they are reading material in a specialized field written in English?"

Their subjects were twelve university students majoring in biochemistry, biology, economics, and history who acted as informants. In all four studies, the students were asked to underline all the words and structures they found difficult to understand in an extract from their course readings; in the fourth, they were also asked to answer some content questions.

Across disciplines, the students were found to have similar problems. These included heavy noun-phrase subjects and objects, syntactic markers of cohesion, and the use of non-technical vocabulary in technical texts.

Study 2. Carrell (1983) set out to study the individual and interactive effects of three separate variables of background knowledge on reading comprehension. The three components were:

1) prior knowledge in the content area of the text: a familiar topic versus a novel one
2) prior knowledge that the text is about a particular content area: context provided versus no context provided
3) degree to which the words in the text reveal the content area: transparent versus opaque vocabulary.

Her subjects were both native and non-native speakers of English, all undergraduates. They were asked to read two 100-word manipulated texts. The topic of one of the texts, "Washing Clothes," was familiar to the students; the other one, "Balloon Serenade," was novel. Some texts were provided with a title and a picture while others were not. The texts had either concrete or abstract lexical items (e.g. 'clothes' versus 'things'). After having read the texts, the subjects were to write down as much as they could remember from the texts.

Then the number of idea units was counted for each recall. The maximums were 17 and 14 for "Washing Clothes" and "Balloon Serenade," respectively. The percentage of idea units recalled ranged from 22 to 53 for the natives, and from 17 to 31 for the intermediate ESL students. In addition, it was found that all the three components of background knowledge affected the recall percentage significantly in the case of natives, whereas not in the case of non-native speakers of English.

Study 3. In his short report, Aslanian (1985) analyses three interview transcripts from three high intermediate English as a second language college students. They had first read a short passage and answered two multiple-choice questions. Here is the text and the questions:

> **Bridges**
> Bridges are built to allow continuous flow of highway and railway traffic across water lying in their paths. But engineers cannot forget the fact that river traffic, too, is essential to our economy. The role of (1) ... is important. To keep these vessels moving freely, bridges are

built high enough, when possible, to let them pass underneath. Sometimes, however, channels must accommodate very tall ships. It may be uneconomical to build a tall enough bridge. The (2) ... would be too high. To save money, engineers build movable bridges.
(1) a. wind b. boats c. weight d. wires e. experience
(2) a. levels b. boats c. standards d. waves e. deck

He found that there was invariably a difference between what the text said and what the students understood. Student 1 failed both multiple-choice questions; still, he got the gist of the text:

Observer: Now tell me everything you understood from this passage? What is the important point in the passage?
Student: To save money, to have movable bridges.

Contrast this with Student 3:

Observer: Now tell me everything you understood from this passage.
Student: I think this passage is about the economy with traffic in ... you see, they're trying to build boats but they feel boats are too expensive because of the economy, the traffic, I guess: they feel that because we have too many traffic, the boats are very important, you know. Because in the river traffic we need more boats.

Student 3 came up with the correct answers to the two multiple-choice questions but "her arguments are all mixed up and sometimes contradictory; moreover, they are frequently irrelevant."

As can be seen from these studies, reading comprehension is not solely a result of text variables such as sentence complexity and length or vocabulary. It is, in fact, to a great extent dependent on reader variables, and language competence is certainly only one among them. Besides, as reading comprehension cannot be observed directly, it can only be measured indirectly. In large-scale testing, it is common to use a number of short passages with multiple-choice questions or, occasionally, open-ended ones. More recently, the cloze procedure has also been used for this purpose. So in addition to the text and reader variables, method variables are also involved in reading comprehension testing and experimentation.

Much of the research on reading comprehension has been psychometric. This means that test situations and real-life reading situations are far apart. There is hardly any context or content for reading. More specifically, comprehension is equated with recalling and texts are very short ranging from one hundred to a few hundred words. And measuring is quantitative. The primary concern is how much has been comprehended, that is, recalled. Measuring is also prescriptive. Therefore, recalls are

compared with original texts only. Further, comprehending, the process, has been neglected.

The conclusions of the three studies seem to point to new directions. Cohen et al. (1979) note:

> It may well be that the question posed in this study, "What is problematic in reading texts in a foreign language?" is ultimately less fruitful for curriculum writers and teachers than the question, "How do learners go about solving problems in reading?" The former yields findings as to forms to teach, and the latter yields insight into cognitive strategies to teach.

And Carrell (1983) concludes:

> ... several additional questions require investigation. For example, do ESL readers utilize these components of background information when reading in their native language but somehow fail to transfer these strategies to reading in a foreign language ... Further, how do nonnative readers conceptualize the reading process? In their native language? In their second language? What do they think they are doing and how are they going about doing it? In other words, we need to know not only what these readers aren't doing, but what they are doing and what they think about what they're doing.

Aslanian (1985) points out finally that psychometric means alone (i.e. multiple-choice questions, cloze procedure, or fill-in-the-blank tasks) are not likely to measure true comprehension. Usually they only indicate what the reader should have understood and not what he has really understood.

On more theoretical grounds, Thorndyke and Yekovich (1980) also question the schema theory. The theory has plausibility but it lacks descriptive power, predictive ability and testability.

Interestingly, questions of this kind have not only been posed within the psycholinguistic framework but also within an educational framework, in particular by a group of educators in Sweden. Instead of comprehending and comprehension, they talk about the learning process and its outcome.

It is primarily their research perspective that tells these educators apart from others. They suggest a phenemenological approach to learning (Elton and Laurillard 1979, Marton 1981, Gibbs et al. 1982). Learning should be studied from a student's point of view, taking into account three factors. First, learning always has a context (e.g. consider a student preparing for a content area midterm examination). Secondly, learning has a meaningful content (e.g. consider a student studying an article as required reading for a seminar). Finally, the learner, an adult, is aware of his/her way of learning and is able to account for it.

Let me review some of their studies into the relationship of the learning process and its outcome.

In one study, Marton (1975) asked thirty university students to read a newspaper article. The article criticized a new curriculum reform. The idea was to increase the examination pass rate, which was considered too low. The writer of the article disagreed. He showed that the basic assumptions of this reform were false and suggested selective measures to be taken instead of the proposed general uniform measures. After reading the article, the students gave a summary of what they had read immediately after the study session and again some four weeks later. They were also asked to tell how they went about reading the article. This way two kinds of data were gained: about the learning outcome and the process.

Qualitative differences were found in the learning outcome data. Four categories were established, and they make up the outcome space:

Category A: The text argues for selective measures to be taken exclusively for those students who do not fill the necessary requirements.

Category B: The text argues for different measures to be taken depending on the student group.

Category C: The text argues for measures to be taken to increase the pass rate.

Category D: The text points out that there are differences between student groups and causes for their differences.

I should stress that this categorization was based on the summaries by the students, not the learning material. The categories are hierarchically inclusive, and they allow not only interindividual but also intraindividual comparisons over time.

The introspective accounts by the students revealed two ways of processing the learning material (see also Marton and Säljö 1976).

There are students who focus their attention on the sign when studying. They process the learning material at a surface level, memorizing as much as possible from it. To give some examples:

a) Well, I just concentrated on trying to remember as much as possible.
b) I remembered ... but, I'd sort of memorized everything I'd read ... no, not everything, but more or less.
c) There were a lot of different lines of thought to follow and try and memorize.

On the other hand, there are students who pay attention to what is meant, trying to understand what the text is about. These students process the text at a deeper level and learn something qualitatively different. To give some examples:

a) I tried to look for ... you know, the principal

ideas ...

b) ... and what you think about then, well it's you know, what was the point of the article, you know.

c) ... I thought about how he had built up the whole thing.

The processing of the learning material and the learning outcome were found to be closely related. As a rule, students with deep-level strategies learned from the article something identical with or close to the writer's intent, whereas students with surface-level strategies learned something more general and hierarchically at a lower level.

Later, Svensson (1976) also found that the way students approach a text affects the outcome.

One approach is atomistic in nature, the other holistic. Atomistic students pay attention to parts of the text, its details and the surface structure. Their recalling is typically reproductive. Holistic students instead focus on the meaning under the surface structure. Their recalling is rather reconstructive.

These studies call for a more holistic approach to learning. And in describing any aspect of learning one should aim at quality rather than quantity; one should consider learning in different contexts rather than in general terms; one should try to understand rather than to explain by establishing causes and effects.

These studies point to new directions in research on content-area reading in English as a foreign language. Study contexts would be pictured from a student's perspective. Non-native readers of English, their learning process and outcomes from learning materials in their mother tongues (which has been the case so far) and in English could be compared, possibly also with those of native readers of English.

This approach would complement present psychometric experimentation. Besides, the findings would also form a better basis for teaching English for Academic Purposes.

* I would like to thank Dr. Peter Lowenberg, Georgetown University, for constructive criticism of an earlier draft of this paper.

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